Prostate Cancer Prediction Using Feedforward Neural Network Trained with Particle Swarm Optimizer

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Abstract Prostate cancer has been one of the most commonly diagnosed cancers in men and one of the leading causes of death in the United States. Because of the complexity of the masses, radiologists are unable to diagnose prostate cancer properly. Many prostate cancer detection methods have been established in the recent past, but they have not effectively diagnosed cancer. It is worth noting that most current studies employ machine learning techniques, especially when creating prediction models from data. Despite its possible benefits compared to standard statistical analyses, these methods break down the problem statements into different parts and combine their results at the final stage. This makes complexity, and the prediction accuracy not consistently high. In this paper, the Feedforward Neural Networks (FNNs) is trained by using Particle Swarm Optimizer (PSO) and the FNNPSO framework is applied to the prediction of prostate cancer. PSO is one of the novel metaheuristics and frequently used for solving several complex problems. The experimental results are evaluated using the mean, best, worst, and standard deviation (Std.) values of the fitness function and compared with other learning algorithms for FNNs, including the Salp Swarm Algorithm (SSA) and Sine Cosine Algorithm (SCA). The experimental finding shows that the FNNPSO framework provides better results than the FNNSSA and FNNSCA in FNN training. Moreover, FNN trained with PSO is also shown to be better accurate than other trained methods to predict prostate cancer.

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Z. Md. Zain et al. (eds.), *Proceedings of the 6th International Conference on Electrical, Control and Computer Engineering*, Lecture Notes in Electrical Engineering 842,
https://doi.org/10.1007/978-981-16-8690-0_36